

## NEW SPECIES OF CHALCIDOIDEA FROM CEYLON.

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All the species described in this paper were obtained at Peradeniya, Ceylon, by Mr. A. Rutherford, the Government Entomologist, and were forwarded by him to the Imperial Bureau of Entomology for identification. In every case the types are deposited in the British Museum.

## Genus POLYCYSTUS, Westwood.

**Polycystus propinquus**, sp. nov.

Very near to *P. luteipes*, How. (Journ. Linn. Soc. Lond., Zool., xxvi, p. 142, 1896), from which, however, it differs as detailed below, in its slightly smaller size, puncturation and antennal structure. A bronzy green species with entirely luteous legs.

♂.—*Head* just wider than the thorax, dark metallic green with cupreous or bronzy reflections, surface moderately coarsely punctured. Clypeal edge straight, medianly incised, with an inconspicuous tooth on each side of the incision.

*Antennae* inserted nearly at the base of the eye, with dark base; scape long, slender, entirely pale, reaching to beyond the anterior ocellus; pedicel longer than the ring joints and the first of the funicle together; two small ring joints, the second slightly larger, first joint of funicle shortest, about three-quarters of the second; the six funicular joints are almost transverse and increase gradually in breadth so that the club is little wider than the preceding joint. In *luteipes* the joints of the funicle are more cylindrical (one being nearly equal to two) and the club broader; in *luteipes* the club and two joints before it, in *propinquus* the club alone, are darkened.

*Thorax* coloured like the head. Puncturation or raised reticulation strong, coarser on mid lobe of mesothorax than in *luteipes*. The parapsidal furrows reach the border of the scutellum, but are more delicate posteriorly than in *luteipes*. Suture between pro- and meso-thorax broad and gleaming. Metanotum smooth and shining. Propodaeum with a median carina and indistinct lateral folds. Spiracle about mid-way on anterior edge between median carina and the fold.

*Abdomen*: Petiole reticulate, with faint median and lateral carinae; colour, purplish black, dull. Abdominal segments smooth, dark, gleaming, the whole triangularly expanded; second segment largest, the others telescoped.

*Legs*: Coxae dark, metallic, the fore pair nearly smooth, greenish; the posterior rather purplish and rougher. Mesopleural impression completely and coarsely reticulate. Legs entirely pale honey-yellow, except the last tarsal joints (fifth) and the claws, which are dark.

*Length*, 1½ mm.; alar expanse, 3¼mm.

*Host*: the bean fly (*Agromyza phaseoli*, Coq.).

Described from a single male.

## Genus TRIGONOASTRA, Ashmead.

The two Sphegigasterines described below agree in having the petiole longer than the coxae, distinctly in the females and slightly in the males, the parapsidal furrows incomplete, no apical cross furrow on the scutellum and the long propodaeum punctate. In all the pronotum is truncate and the upper edge acute. Ashmead, in diagnosing the genus (Mem. Carn. Mus., i, no. 4, pp. 330-332, 1904), gives as type *T. aurata*, a species I have been unable to trace. *T. rugosa*, sp. n., and *T. megacephalus*, sp. n., may be separated at once by the antennae. The former is a green, the latter a dull purplish black species.

**Trigonogastra rugosa**, sp. nov. (fig. 1).

A moderately and evenly shagreened or reticulate species, with the head, thorax and propodaeum very dark green; the abdomen shining blackish, with a paler brown median area (in the ♂ only) on the first and second segments; legs brownish yellow with darker tarsi; antennae with the scape lighter, remaining joints darker brown.

♂.—*Head* large, seen from in front, rounded at the sides, broader than deep, though descending with a large malar space to the mouth edge. Vertex so wide as to equal the thorax on the intraorbital diameter alone; ocellar triangle distinctly elevated, occupying a little over the central third of the vertex; no occipital ridge, the vertex and occiput merging roundly into one another. Frons concave, dull, gleaming, with rather fine reticulation as on the vertex; scrobes oval, antennae set on the mid diameter between the eyes, and well above the middle of the frons; the mid point of the scape is at or above the ocelli. Clypeal edge with two slight rounded lobes.

*Antennae* (fig. 1, a) long and filiform and of practically the same breadth throughout, the club being little expanded. Thirteen joints: scape, pedicel, two ring joints, seven funicular, and club of two. Scape as long as the pedicel, the ring joints, the first funicular and half of the second, together; flavescent brown in colour, with about half-a-dozen short bristles along the dorsal edge and one or two ventrally, otherwise bare, broadest before the apex, the breadth about one-sixth of the length of the scape. Ring joints distinct and separate, the second robust, darker, and half as long again as the first. Funicle and club blackish brown; the funicular joints decreasing in length towards the club; the first is longest, slightly exceeding the second, which equals the third, the fifth and sixth again being equal; the seventh (eleventh) is the shortest of all, being to the first in the ratio of five to seven; the club joints are equal. The funicle and club bear elongated "sensoria" with low flanges, and each joint shows besides up to fifty or more longish hairs, giving the whole antenna a pilose appearance. Length of antenna, 1.5 mm.

*Mandibles* (fig. 1, c) heterodont, the right with four teeth, of which the outermost is the most acute and longest, the second smaller, and the third and fourth equal; left with three equal teeth, the outermost more acute.

*Thorax* with incomplete parapsidal furrows, and evenly reticulate, of about the same coarseness as the head, slightly coarser on scutellum. Propodaeum as long as the scutellum, and with only slightly finer reticulation, transverse, with posteriorly convergent sides; produced behind broadly into a neck, so that the whole segment from above is roughly a truncate triangle. There is an indefinite median ridge and a rather extensive sulcus anteriorly on each side behind the metathoracic edge. Spiracles small, oval.

*Fore wings*, two-and-a-half times as long as broad. Submarginal cell long and narrow with about a dozen bristles. Submarginal vein with about twelve to fourteen bristles, marginal, and post-marginal combined, with about the same number of bristles. Radius long, club distinct, four cells. There is, besides the bare basal triangle, an unclotted space below the uprise of the submarginal to the marginal. Submarginal: marginal: radius: post-marginal—10:4:3:6. Length, 1.35 mm., breadth, .55 mm. Hind wings: length, .96 mm.; breadth, .16 mm.

*Legs*: all coxae black, from the trochanter to the second tarsal joint in all the legs brownish yellow, the last tarsal joints becoming progressively browner.

*Abdomen*: short, much less than the thorax, triangular. First and second tergites closely associated, occupying about one-half of the visible surface; tergite 3 rather long, about equal to 2; the remainder of the segments are telescoped.

Length, 1.3 mm.; alar expanse, about  $2\frac{1}{2}$  mm.

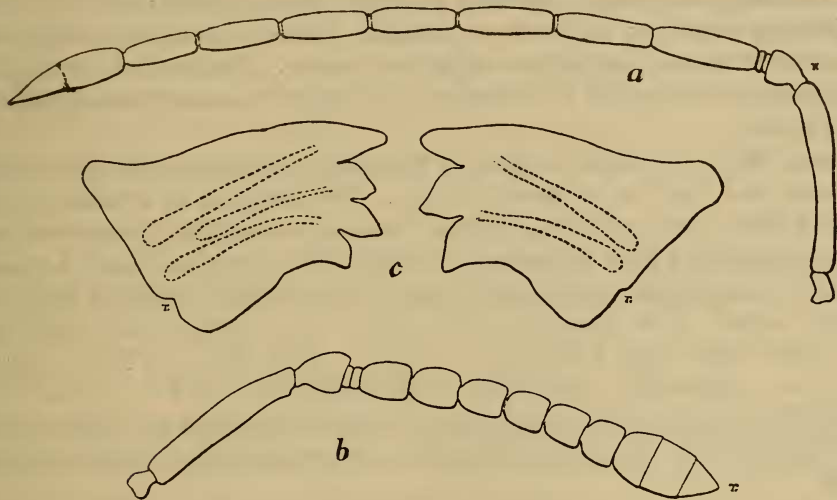


Fig. 1. *Trigonogastra rugosa*, sp. n.; a, antenna of ♂; b, antenna of ♀; c, mandibles of ♂.

♀.—*Head*, from in front, rounded, oval, wider than deep (5:4), frons and vertex purplish, rather dull, reticulate, but smooth, the pattern not being raised. Clypeal edges as in the ♂.

*Antennae* (fig. 1, b) with the scape, pedicel, and ring joint, flavescent, the pedicel darker; funicle and club in decided contrast, almost black. Scape over four-and-a-half times as long as broad; pedicel less than one-third of scape, with length to breadth as 3:2. The first four funicular joints are longer than broad, the fifth quadrate, and the sixth broader than long. They are in the ratio 10, 10, 9, 9, 8, 8. In the same proportion the breadth of the first five joints is 8 and that of the sixth a little over 9. The club is considerably expanded, with joints in the proportion, 5:4:5, the greatest breadth between joints one and two being 7. The sensoria are numerous, from eight on the first funicular joint, to twelve on the second club joint. There is besides a somewhat large terminal sense-organ. Length of antennae, barely .95 mm.

*Thorax* with coxae and propodaeum dark metallic green, notal and pleural surfaces entirely evenly and moderately raised, reticulate.

*Legs* transparent yellow, with a slight tinge of brown on femora ; the fifth tarsal joints and claws blackish brown.

*Abdomen* not triangular, but swollen, spindle-shaped, very dark and smooth, three-fourths formed by the large second and third segments. Petiole long, extending to the distal end of the trochanter.

*Length*,  $1\frac{1}{2}$  mm. ; alar expanse, over 3 mm.

*Host* : the bean fly (*Agromyza phaseoli*, Coq.).

Described from a series of 3 ♂♂ and 2 ♀♀.

*Holotype*—a ♂.

***Trigonogastra megacephala*, sp. nov. (fig. 2).**

♂.—*Head* large and broad, with wide frons and vertex, closely punctate or reticulate, gleaming or shining, and nowhere metallic. Colour almost black, with greenish tinge on the frons and purplish on occiput and vertex. The head of the single ♂ is so embedded in the fixative as to render comparative measurements of length and breadth unsafe.

*Antennae* (fig. 2, *a*) similar to those of *T. rugosa*, ♂, but the joints are not longer than broad, and much more sparsely haired. The antennae as a whole are rather short and dark, the scape being lighter. Scape four-and-a-half times as long as broad, pre-apically a little expanded. Pedicel, a little over one-third of the scape and hardly longer than broad. Two ring joints, the first narrower and shorter than the second. First funicular joint square, narrower than the others (4:5), second joint longer than broad, 3 to 6 square. The club is a little expanded, but not very appreciably, with joints in the proportion, 10:9:8. There are few sensoria ; the second and third joints have one each ; the fourth and fifth, two each ; the sixth has four and the club joints four, two, one respectively. Length of antenna, .65 mm.

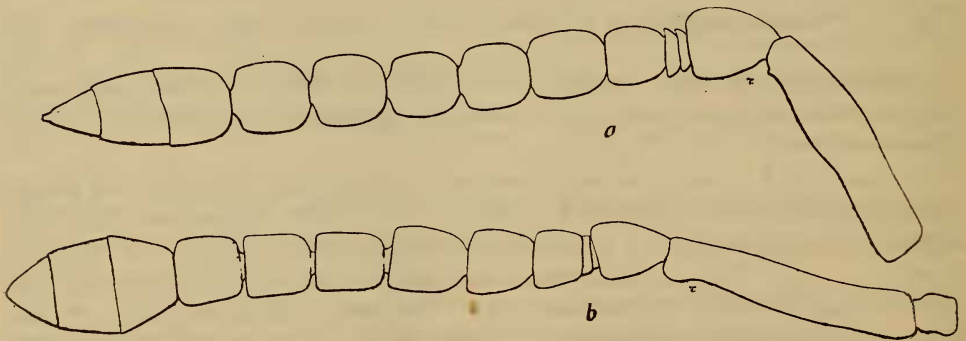


Fig. 2. *Trigonogastra megacephala*, sp. n. ; *a*, antenna of ♂ ; *b*, antenna of ♀.

*Thorax* broad and depressed, with the dark purple colour of the head and the same reticulation ; the pattern on the scutellum finer than in front of the suture. Metathorax gleaming, purplish blue ; propodaeum entirely reticulate, dull.



*Wings*: not twice as long as broad (19 : 10), rather broad and somewhat bare on the basal region, evenly haired, and with one row of isoclined hairs parallel to the hind margin, at some distance above it (about one-sixth the breadth of the wing). Submarginal : marginal : post-marginal—4 : 2 : 1 ; while the post-marginal is somewhat longer than the radius (9 : 8). Length, .95 mm. ; breadth, .5 mm. Hind wings short, four times as long as broad. Length, .72 mm. ; breadth, .18 mm.

*Legs* entirely flavescent, except the claws and the coxae, which are black.

*Abdomen* short and broad, but hardly so triangular as in *rugosa* ; entirely shining, purplish black ; second segment over one-third of the whole.

*Length*, less than 1.5 mm. ; alar expanse, 2.4 mm.

♀.—*Head* roughened or reticulate down to the clypeal edge, which is striately marked.

*Antennae* (fig. 2, b) with the scape flavescent, six times as long as broad, not swollen near the apex. Pedicel more than a third of the scape and longer than broad (5 : 3). First funicular joint a little broader than long, and shorter than the second. Joints 2 to 5 equal and quadrate, the sixth hardly shorter and also quadrate ; club distinctly expanded, with sub-equal segments (17 : 16 : 15). The sensoria of the funicle and club are more numerous in the ♀ than in the ♂, 3, 4, 6, 6, 8, 8 ; 8, 8, 4. The pedicel of the ♂ antenna is also broader and more swollen than in the ♀. Length of antenna, .60 mm.

In other respects the ♀ is very similar in dimensions, colour, etc., to the ♂.

Described from a single pair, ♂ and ♀. These insects were bred from a jak fruit (*Artocarpus*) which had been attacked by some undetermined insect.

#### Genus CLOSTROCERUS, Westw. (1833).

To this genus belong some of the most beautiful Entedonine (Omphaline) flies. The species are characterised by a fine refringent sculpture on the head and thorax, by their exceedingly brilliant metallic colour, and the maculate or banded forewings. The antennae are much flattened and the demarcation between club and funicle is hard to recognise. Westwood (*Mag. Nat. Hist.*, p. 419, fig. 55c, 1833) in defining the genus neither mentions nor figures a ring joint. He assigns 8 joints to the genus, remarking that the last is "very minute and subulate" ; apparently he ranked as a joint the terminal spur of the seventh visible segment. Girault's account (*Mem. Queensld. Mus.*, ii, p. 177, 10th Dec. 1913) is more precise. There are seven apparent segments to the antennae, or eight reckoning the tiny ring joint which is practically concealed within a cavity of the scape. Similar flattened antennae are found in *Neochrysocharis*, Kurdj. (*Revue Russe d'Ent.*, xii, no. 2, p. 234, fig. 3, 1912), but the wings in this genus are hyaline.

The genus *Closterocerus*, Westw., is at present a small one. Schmiedeknecht (*Gen. Ins. Wytzman*, p. 428, 1909) lists 11 species, and one or two have since been described from North America, Java and Australia. Kurdjumov (*loc. cit.*, p. 235) points out that besides *formosus*, Westw., and *trifasciatus*, Westw., *Entedon ovulorum*, Ratz., should be placed here. There are therefore at least three European forms. Crawford (*Proc. U.S. Nat. Mus.*, xliii, p. 175, 1913) mentions five species (one doubtfully) as

occurring in the States. From the West Indies are recorded *C. albipes*, Ashm. (Journ. Linn. Soc. Lond. Zool., xxv, p. 177, 1894), *C. auriceps*, Ashm. (*l.c.*), *C. leucopus*, Ashm. (*l.c.*) and Schmiedeknecht adds *C. (Derostenus) rotundus*, Ashm. (*l.c.*, p. 174).

From an examination of the types or co-types of these West Indian species, I have doubts whether any should be included in Westwood's genus. On the other hand *Necremnus purpureus*, Howard (Journ. Linn. Soc. Lond. Zool., xxvi, p. 164, 1896), is, so far as one can judge, a true and very distinct species of *Closterocerus*. Unfortunately, the unique type is headless.

Two South American forms have also been included here, viz., *Entedon xenodice*, Walk. (Ann. Mag. Nat. Hist., x, p. 273, 1843) and *E. pelor*, Walk. (Ann. Mag. Nat. Hist., xi, p. 185, 1843), both Chilian species, with long-fringed and slightly clouded wings. The propodæum of these insects, however, has two delicate divergent central keels and the structure of the thorax appears to be different from that of *Closterocerus*.

Two examples of a *Closterocerus* apparently new and conspecific are included in Mr. Rutherford's gatherings. Neither is, unfortunately, in very good condition, but it has been possible to draw up a fairly complete account from one or other of the specimens of the species described below.

*C. insignis*, sp. nov., comes very near to the genotype *C. trifasciatus*, Westw., but differs in size, being only two-thirds as long. In *C. trifasciatus* the metanotum is concolorous with the scutellum and distinctly, though finely, punctate. In *C. insignis* the metanotum is concolorous with the propodæum, shining and appearing as a gleaming edge to the scutellum. In the new form also the mid tibiae seem lighter in colour and the fringe to the fore wings relatively longer. The antennae also show important differences, those of *C. insignis* being relatively broader and flatter, with the first three funicular joints sub-equal and the fourth hardly narrower than the third; while in *C. trifasciatus* the second funicular joint is distinctly greatest, the fourth diminishing rather suddenly as compared with the third. In *C. insignis* the ring joint is extremely minute ( $\cdot 025$  mm. broad; distinctly visible only under obj.  $\frac{1}{12} \times$  ocular iii, Zeiss), and the edge is barely above the rim of the pocket in the pedicel in which it is accommodated.

The species may be shortly diagnosed as of moderate size, the head and thorax brilliant dark green, the parapsides bluer, the remainder of the body dark purple violaceous. Wings trifasciate, the basal band indistinct, the median broad, and the terminal narrow. Marginal vein very long. All the hind legs, except the last three tarsal joints, dark.

#### ***Closterocerus insignis*, sp. nov. (fig. 3).**

♀.—*Head* very wide and narrow on the vertex. Eyes quite bare, occiput reticulate, brilliant blue-green, rather dark; vertex and frons (fig. 3, c) to level of scrobes reticulate, rich dark blue in colour near eye margins, with a greenish lustre round the smooth ocellar triangle; scrobes oval, with a longitudinally striated triangular sclerite bearing two bristles between. Above the mouth the violet-coloured clypeus is so faintly reticulate as to be practically smooth. Mandibles (fig. 3, b) bidentate\* and of normal shape; inner tooth larger, its inner edge once slightly

\* Girault describes the Australian forms as tridentate.

sinuated; three longer bristles near the outer edge, and one or two near the apex; outer edge rather deeply concave near the broad base. As in *Chrysocharis*, the palpi (maxillary and labial) bear one stout apical bristle and another nearer the base, one bristle between the labial palpi, and one behind the maxillary palpus near the edge.

*Antennae* (fig. 3, *a*) remarkably compressed, with seven apparent joints, in reality eight, the ring joint concealed. Scape triangular, expanded distally, two-and-a-half times as long as broad, and almost equal to the pedicel and first three funicular joints. All the bristles of the antennae are stout, and in particular the pair at the upper distal

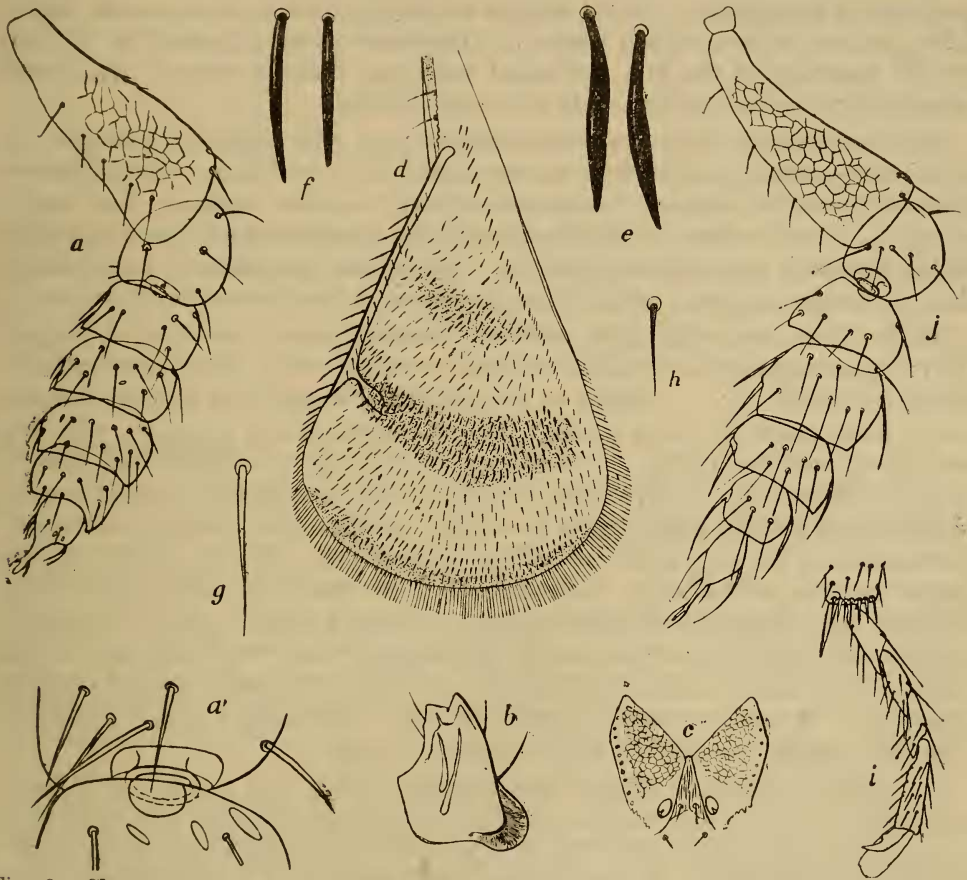


Fig. 3. *Closterocherus insignis*, sp. n., ♀; *a*, antenna; *a'*, concealed ring joint; *b*, mandible; *c*, irons; *d*, wing; *e*, hairs inside base of radius; *f*, hairs from darker band; *g*, hyaline hair from clear area; *h*, hair from under surface of dark band; *i*, hind tarsus; *j*, antenna of *Closterocherus trifasciatus*, Westw., ♀.

angle of the scape are almost spine-like. On its upper half the scape is moderately thick, but below this it is drawn out into a long edge. Pedicel as long as broad, with convex sides; no sensoria. No definite club, all the funicular joints, save the last, broader than long, considerably flattened, with sharp edges; only simple, strong bristles and narrow, oval or more elongate sensoria present; last joint pear-shaped, with long terminal style.



*Thorax* considerably depressed, coloured like occiput, but bluer at the sides. Mid-lobe of mesonotum and the scutellum broad. The parapsides and axillae narrower than usual; the axillae wide apart and only a little entering the parapsides. Entire tegument of thorax heavily chitinised and so densely reticulate as to appear punctate, except under a high power. The usual pair of Entedonine bristles on the scutellum; tip of scutellum narrowly shining. Mesophragma short, descending almost vertically and not directed backwards; mesoprepectus very large; the pleurae coarsely reticulate. Metathorax and propodaeum narrow, together only half as long as broad, the former almost linear; no postero-lateral horns or processes to propodaeum. Notal surface coarsely reticulate at sides, with lateral folds, but no median carinae present. Propodaeum deeply incised (up to half) for the reception of the first abdominal segment. Spiracle narrow, oval, small, opening at the outer anterior angle of the lateral fold.

*Abdomen* rounded, oval. Segments subequal; on each there is a posterior row of bristles—medianly incomplete on segments 1 to 3—with one or two others in front at the sides. Surface of abdomen slightly reticulate medianly from seg. 3 to seg. 5. The saw bears terminally about half-a-dozen teeth and the free portion of the sheath is one-sixth of the whole. Metathorax, propodaeum and abdomen dark violaceous or purple, with lighter reflections on the disc of the abdomen.

*Wings*: Fore wing (fig. 3, *d*) with the marginal longer than the submarginal (2:1); post-marginal and radius subequal. Whole wing broadened apically; length to breadth, 2 : 1. Bristles on marginal veins strong, from the post-marginal to the lower angle the fringe is long. Radial vein thick and spatulate, with four cells rising near the middle. The surface of the wing is covered with hairs of unequal calibre (fig. 3, *e-h*); next the distal edge is a band 3-6 rows deep of thicker, short bristles, almost black in colour; a similar belt, half as broad again, stretches across the wing at the end of the marginal vein, and another, less definite, nearer the base of the wing; between these belts there are weak hyaline hairs; the clear band parallel to the hind margin is somewhat broad. All the veins dark; a small dark patch below the end of the marginal vein; the wing also is dark wherever the heavier bristles are disposed, and hence its characteristically banded appearance. Length, .9 mm.; breadth, .45 mm. Hind wings hyaline, unclouded, with long fringe. Length, .75 mm.; breadth, .2 mm.

*Legs* with all coxae and femora, hind trochanter, hind tibia and first hind tarsal joint black; fore and mid trochanters smoky; fore and mid tibiae, with their tarsi, and last three hind tarsal joints (fig. 3, *i*) pale, the fore tibiae being a little smoky, especially near the base. The proportions of the tarsal joints are remarkable, being practically the same in all the legs, both absolutely and relatively.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. ..	13	14	14	38
Mid .. ..	15	15	15	40
Hind .. ..	14	15	16	40



The preapical tibial spur of the fore legs short and weak; the spur of the second tibia long and saltatorial, reaching to the middle of the second tarsal joint; the subapical femoral spurs of the same leg strong; the tibial spur of third leg strong and short, with a comb of seven short spines on inner aspect.

*Length*, 1.25 mm.; alar expanse, nearly 2.5 mm.

Described from a single female, bred 3., viii., 1914.

*Host*: the tea fly (*Oscinis theae*).

#### Genus SYMPIESIS, Först.

The following species is apparently congeneric with *Sympiesis felti*, Crawford, (Proc. U.S. Nat. Mus., xl. p. 448, 1911), described from *Agromyza melanopyga* in fern leaves. In the single ♂ present in the material the frons had been injured and the antennae crushed off at the scape. Two chitinous fragments adhering to the face were detached, and after treating with potash followed by glacial acetic acid, were sufficiently swollen to be identified as the first and second funicular joints; neither was furnished with a branch or unusually long hair. All the generic characters are, I think, distinctly marked, except in the condition of the hind tibia, which unless carefully examined, might be taken as indicating a Hemitarsenine affinity. The second spur, however, though short, is undoubtedly present. *Sympiesis purpureus* is a purplish black form, with duller thorax and entirely dark antennae. The abdomen shows bluer reflections. The legs are pale, with darker tarsal tips and femoral streaks.

#### **Sympiesis purpureus**, sp. nov. (fig. 4).

♀.—*Head* much broader than deep (4:3), eyes bare, swollen and prominent. Vertex, frons and clypeus shining, without pattern (except within the ocellar triangle); scrobes roughly circular, or square with rounded angles; a narrow linear ridge between the mouth corner and the lower eye angle; clypeal edge simple, concave. Occiput reticulate, with a few short bristles. At each side of the vertex two bristles; posterior ocelli wide apart near the occipital edge, with four bristles between and one in front of each; along the orbits about 10 minute bristles. Frons remarkably bare. Before the narrow ridge separating the face from the genae are two minute bristles, and four more stand in a square above the middle of the mouth edge. Although the surface of the face is uniformly smooth, there is an internal reticulation of the integument demonstrable by focussing through. Behind the malar keel there is a distinct, curved, elongate reticulation, and the usual row of post-ocular bristles.

*Antennae* (fig. 4, a) with scape, pedicel, ring joints, four funicular, and two club joints. Scape long and narrow (5:1); pedicel transverse, hardly wider than the scape and extremely short (one-fifth of the scape or one-half the first funicular joint), with a reticulation so coarse that one cell extends almost the length of the joint; ring joints (two) minute, narrow, closely appressed. Joints of funicle equal, the first distinctly, the second almost, cylindrical; joints 3 and 4 appear slightly shorter, as their distal angles are rounded off and the joint produced into a neck. Club not expanded, one-and-a-half times as long as the joint of the funicle; basal joint a little longer than the apical one, which has a short, blunt spur. The whole antennae bristly and the flanges of the sensoria stout. Length of antenna, .65 mm.

*Mouth-parts* (fig. 4, *b, c*): cardo shaped like a jack-boot, stipes rather narrow; maxillary palpus two-jointed (2:3), the first joint broader and bare, the second slightly tapered, with one bristle near base, three more distally and a long terminal one with a minute bristle at the side. Mentum rather broad, reticulate like the stipes. Labial palpus just exceeding basal joint of maxillary palpus, ending truncately with two long bristles and a minute one between. The lingua with six setigerous marginal cells. Mandibles somewhat oblong, with an outer (ventral) strong tooth separated by a deep incision from an inner one which is somewhat longer. The apical inner (upper) edge of the mandible is serrate with three to four denticles. Posteriorly the inner edge is strongly angled at one-half and swollen again basally. In both ♀♀ examined the denticles on the left mandible are more strongly developed.

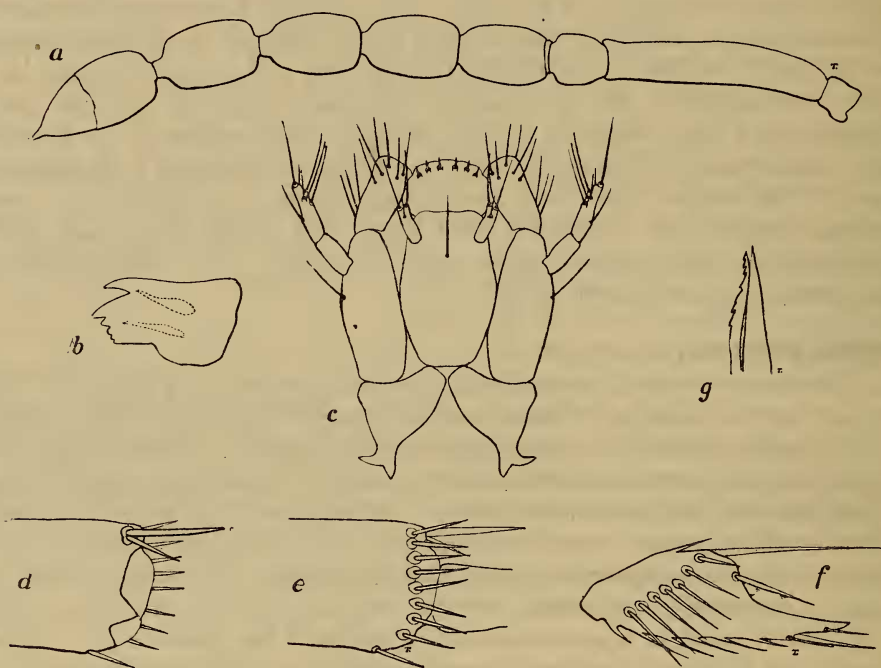


Fig. 4. *Sympiesis purpureus*, sp. n., ♀; *a*, antenna; *b*, mandible; *c*, trophi; *d*, apex of hind tibia (front view); *e*, the same (from behind); *f*, first joint of fore tarsus (front view); *g*, apex of ovipositor.

*Thorax*: prothorax coarsely reticulate, save for a rather broad median area where the pattern is fine and transversely drawn out. There is a small postero-lateral semi-circular excision for the spiracle. On each side of the bare median area posteriorly are three strong bristles, with three to four weaker ones in front, besides one or two microscopic bristles; on the anterior edge are two median bristles. Mesonotum with generally equal, moderate, clearly raised reticulation, which is just a little coarser posteriorly. Parapsidal furrows merely indicated anteriorly. The bare axillae penetrate deeply and their pattern is rather drawn out and not raised. One bristle opposite the inner anterior angle of the axillae, another in front, between

the apex of the axillae and the end of the furrow, and a third behind the edge of the prothorax near the middle. Scutellum with two bristles on each side, both beyond one-half; pattern finer than on the mesonotum, drawn out and hardly raised. Mesopleurae reticulate; mesoprepectus large, with coarse raised pattern; metanotum medianly reticulate, with smooth side areas; propodaeum smooth, with well-developed keel. Spiracles nearly circular, "metapleurae" with a fringe of six to seven silky hairs on lowest edge above the ridge.

*Wings*: fore wings having the submarginal cell well developed, with a dozen hairs. Submarginal vein with nine to ten bristles; the portion of the marginal vein which bounds the submarginal cell bears five to six bristles, and on the rest are numerous dense short bristles. The radius is short, with a narrow neck and quadrate end; four cells; post-marginal twice the radius; marginal ciliation short. Submarginal: marginal: radius: post-marginal, as 5:10:1:2. Behind the marginal vein is a narrow clear strip with one row of twelve bristles; from the junction of the marginal and submarginal veins a row of six slopes towards the posterior edge, bounding the clear area referred to. Parallel with the hind margin runs a row of isoclined hairs, from which, above the middle of the frenulum, a double row of similar hairs, bounding a very narrow and not well-defined line, goes to the middle of the distal edge of the wing. The rest of the wing, except the basal triangle, is evenly haired. Length, 1.1 mm.; breadth, .55 mm. Hind wings: length, .9 mm.; breadth, .20 mm.

*Legs*: all the coxae blackish, all the fourth tarsal joints dusky and blackish at the tips, the remaining joints of the tarsi and the tibiae pale; the femora are mainly pale medianly, with a blackish streak on the upper and lower edges in the fore and hind legs, more extensive in the femur; in the mid legs the black femoral streak is developed almost entirely on the ventral edge. *Fore legs*: coxae coarsely reticulate outside near base, apical bristle rather long, six to eight minute pre-apical hairs. Femur not swollen, somewhat bare, with only three to four hairs in the ventral row, all on basal half; the pre-apical postero-ventral bristle is long; there are five to six hairs on the upper edge, and on the posterior face a median row of eight to ten bristles, and four to five shorter ones below the apical edge; on the anterior face are over a dozen short bristles disposed in two irregular rows along the upper edge, the two subapical and median ones being stronger. Tibiae with eight to nine bristles on the upper edge, and numerous weak short bristles on the ventral aspect, mainly towards the apex; two anterior stouter bristles; the apical ventral bristle is single. First tarsal joint with a distinct comb of six even parallel short spines on the anterior aspect. *Mid legs*: the coxa bears a patch of five clear short spines on the inside. Femur with a submedian posterior row of five bristles, beginning at one-third from the base to near the apex; subapical bristle dark and strong, spine-like. *Hind legs*: femur with eight to nine bristles on anterior aspect ventrally, but some distance above the edge; another row (six to seven) just above the middle line, mainly on the apical half; between this row and the edge there are about half-a-dozen shorter bristles; on the posterior surface are several scattered bristles, of which about six (rather longer) form a median row. Tibia with one long and one short stout apical spine, and besides a transverse comb of about eight spines.



*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. ..	15	20	20	40
Mid .. ..	20	28	24	36
Hind .. ..	20	30	20	40

*Abdomen* with all segments subequal; 2 and 3 shorter, 4 to 7 a little longer. The middle of the dorsum smooth, while the tergites are reticulate on the overlapping flaps. Spiracle small and round. The eighth tergite is very bristly; the stylet short, conical, with five bristles (one long). Free portion of sheath, which is broad, oval, pointed, with about 20 shorter bristles, one-fifth of the base. The saw is pale, with a black apex and seven distinct teeth; three are at the apex, then after a deep notch follow three more, with a seventh, rather fainter.

*Length*, over  $1\frac{1}{2}$  mm.; alar expanse, about 3 mm.

*Host*: a microlepidopterous leaf-miner (*Acrocercops ordinatella*, Meyr.) of the camphor plant.

Described from 1 ♂ and 4 ♀♀.

*Holotype*—a ♀

## Genus SYNTOMOSPHYRUM, Förster.

Perhaps the most interesting of Mr. Rutherford's captures is a Tetrastichine species represented by three ♀♀ assignable apparently to the above genus. All three examples were bred from a Coccinellid pupa, two being robust and of equal size, while the third is considerably smaller.

I have elsewhere (p. 364) given my reasons for restricting the name *Syntomosphyrum* to Tetrastichines with an unlined mid lobe on the mesothorax, while the scutellum is furrowed only between the dorsal and lateral aspects. In the present case the apex of the mid lobe shews a minute median excision at the suture, the mid line of the lobe being, if anything, paler, and apparently a little depressed posteriorly, though no real impressed line or furrow can be traced. After potash, the scutellum exhibits two extremely fine and incomplete parallel longitudinal lines inside the lateral sulci. In thoracic characters, then, *S. taprobanes* occupies a transitional position between *Syntomosphyrum*, *Tetrastichodes* and *Tetrastichus*. The concomitant antennal characters are also somewhat variable, e.g., the ring joints and the number of funicular joints. Therefore without questioning their practical utility, I think it likely that the above genera constitute a graded series with no very natural division. I have placed the Ceylonese form in *Syntomosphyrum* mainly because of its evident affinity with the species Silvestri has described under the name *S. indicum* (Boll. Lab. Zool. Agr. Portici, iv, p. 232-344, fig. iii-viii, 1910). The two indeed come close, but there are minute differences all over, which induce me to treat them separately at present. Of these differences, some of which are tabulated below, the most easily recognised lie in the antennae and hind tarsi. The species



also appear to be quite different in habit. The ♀♀ of *S. taprobanes* probably seek and sting their prey in the normal manner. Silvestri ( Report of an Expedition to Africa in search of the natural enemies of Fruit Flies (Trypaneidae); Territory of Hawaii, Board of Agriculture and Forestry, Bull. No. 3, Div. of Entomology, p. 126, 11th Feb. 1914) describes how the ♀♀ of *S. indicum*, having found a fruit with broken rind, carefully test with their antennae for their prey, in pursuit of which, when located, they plunge into the decaying pulp and entirely disappear from view. Eventually the larva is overtaken in spite of its strenuous efforts to escape, and oviposition takes place.

**Syntomosphyrum taprobanes**, sp. nov. (fig. 5).

Head broader than deep (4:3), entirely shining black. After potash, the integument shows a finely reticulated pattern, but the space above the mouth is almost smooth. Clypeal edge bilobed; scrobes not far apart, oblong oval, set plainly above the base line of the eyes; a well defined keel from the corner of the mouth to the inner lower angle of the eye; malar space three-quarters the depth of the eye. Three short stiff bristles on orbits at vertex, two between orbits and middle of occiput, six (?) on the ocellar triangle, with a few shorter ones on vertex behind the triangle and on the top of the occiput below. No occipital ridge or sharp edge. At the top of each frontal sclerite, above or near the apex of the scape, about eight minute bristles and nearly a dozen below to the level of the scrobes; also about a dozen between each scrobe and the malar keel, three minute bristles on each clypeal lobe, and one or two more between the mouth edge and the base of the scrobes.

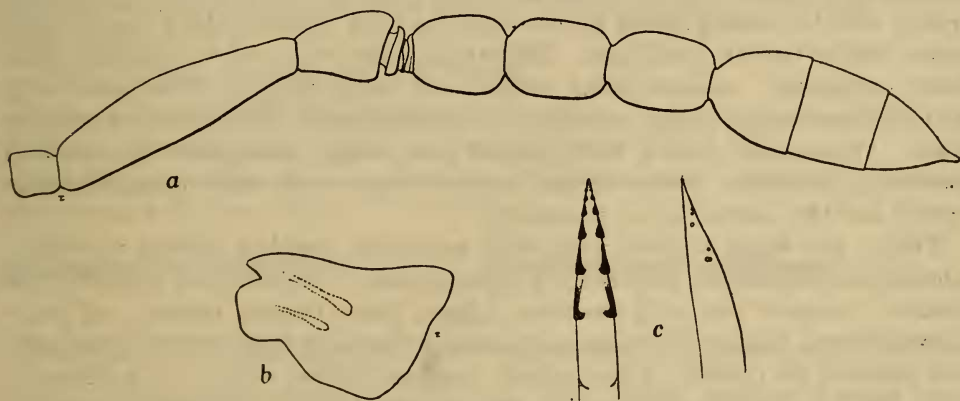


Fig. 5. *Syntomosphyrum taprobanes*, sp. n., ♀; a, antenna; b, mandible; c, apex of ovipositor.

*Antennae* (fig. 5, a) 10-jointed; scape, pedicel, two ring joints, three funicular, and three in club; entirely dark blackish brown. Scape four times as long as broad; pedicel one-third the length of the scape; the first ring joint more robust and brownish, the second hyaline and bilaminar. Joints of funicle increasing in ratio (C120)

8:9:10, the first as wide as long, the next two longer than wide; the joints bear from six to ten or more sensoria. Club joints practically equal in length (15:15:14), but the second is broadest, while the third is suddenly tapered; terminal hair of spur short and fine, not more than a quarter of the third club joint; club as a whole definitely wider than the funicle. Length of antenna, .75 mm.

*Mouth-parts*: mandibles (fig. 5, b), outer (ventral) edge gently concave towards the base, bidentate; outer tooth smaller, separated by a sharp but not deep notch from the inner, which is broad, with straight, truncated apex projecting a little beyond the outer tooth. Inner edge of the second tooth slightly swollen, as is also the basal two-thirds of the inner edge, which as a whole is concave at the base of the second tooth. Maxillary palpus two and a half times as long as the labial palpus; cardo with two bristles, one larger lateral, the other opposite the base of the palpus. Two (?) short bristles just behind the base of the palpi on the mentum; four short bristles from single cells in the lingua. The labrum bears anteriorly two strong median and two weaker lateral bristles (1, 2. 1.)

*Thorax*: prothorax semicircularly emarginate at the spiracle, with bare triangular area (whose base occupies the median one-third of the posterior margin) flanked on either side by about ten microscopic bristles; posterior row of bristles 3,3, and one additional, stronger at the spiracle; the whole surface evenly and moderately reticulate. Mesothorax with the parapsidal furrows straight, except for a slight outward bend anteriorly; mid lobe black, gleaming, surface covered by an extremely fine (especially medianly) drawn out reticulation; on the inside of each furrow are three bristles; parapsides invaded very deeply (to beyond one-half anteriorly from the suture), with two bristles; at the middle of the suture the mid lobe is narrowly depressed for a short distance forward, but no definite furrow is formed. Scutellum square, with two strong lateral furrows and two faint impressed lines inside; reticulation similar to that of mid lobe. Mesosternum distinctly, and mesopleurae rather faintly reticulate; mesoprepectus narrow and wedge-shaped. Metathorax with the middle area rather narrow, reticulate; side areas smooth, with one or two irregular rugae. Propodaeum with a short central keel, deeply emarginate (to one-half) posteriorly, reticulate, hardly raised; spiracle large, oval, with a longish bristle outside and two shorter in line posteriorly.

*Wings*: fore wings with the veins stout and black, marginal ciliation moderate; submarginal cell narrow, with about a dozen bristles. Submarginal vein with two bristles; marginal vein with less than a dozen larger fringing bristles, and many others shorter; radius thick, slightly expanded towards the apex, concavely truncate, four cells and six bristles. Submarginal; marginal: radius, as 10:15:4. Length, 1.45; breadth, .65 mm. Hind wings with the veins thick; submarginal: marginal, as 5:6. Length, 1.1 mm.; breadth, .25 mm.

*Legs*: not densely clothed; all the coxae, trochanters and femora (except indistinctly near the apex) blackish; the tibiae fuscous, almost black; the tarsal joints concolorous with the tibiae, those of the mid legs somewhat paler. Fore legs with the ventral fringing hairs short and weak, pre-apical bristle inconspicuous; tibia with single short stout apical spine, and a row of about ten short bristles on outer aspect; across the apex a comb of four spines; first tarsal joint with, on the inside, a longitudinal comb of six short stiff bristles. Mid legs with the femora almost

bare ventrally ; tibia with apical comb of four spines and spur as long as first tarsal joint. Hind tibia with apical comb of from seven to eight spines and spur shorter than the first tarsal joint.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. ..	17	30	30	40
Mid .. ..	22	35	32	45
Hind .. ..	25	38	35	45

*Abdomen* rather broad and short, shining black ; the tergites faintly reticulate medianly, but distinctly so at the sides and on the portion underlapping the sternites ; petiole short ; tergites 2 and 5 subequal. Post-median row of bristles interrupted in the middle on tergites 2 and 3. Spiracle small and circular. The stylet on tergite 8 very short, bearing four longish equal bristles ; at least twenty bristles in front and eight to nine behind the stylets ; there are besides six to eight longer bristles on the ventral edge, overlapping the upper sheath of the ovipositor (tergite 9). Ovipositor with the side-pieces (from sternite 8) expanded distally and ending in a somewhat long acute point. They do not share in the serration of the saw proper, which bears three to four extremely minute apical teeth and three much stouter behind ; these serrations extend only over the apical one-eighth of the saw (fig. 5, c) which is .4 mm. long and stout basally. The sheath (ninth tergite) is rather longer than the saw, and the distal articulated portion is two-ninths of the whole ; each free lobe bears four bristles and there are two others on the apex of the fixed portion of the tergite.

*Length*  $1\frac{1}{2}$  mm. ; alar expanse, over  $3\frac{1}{4}$  mm.

*Host* : a Coccinellid beetle (*Scymnus* sp.)

Described from a ♀ bred from the pupa of a *Scymnus*, 20. ii. 14.

The following statement sets forth the characters which distinguish this new species from *S. indicum*, Silv.

**Syntomosphyrum indicum**, Silv.

**Syntomosphyrum taprobanes**, sp. n.

*Head.*

- |  |   |
|--|---|
| 1. Two-thirds of scrobes below base line of eyes.  | 1. Scrobes clearly above base line of eyes,   |
| 2. Frons behind scape with only a few bristles (8 to 10).  | 2. Frons behind scape with many short bristles (20 to 24).  |
| 3. Inner mandibular tooth with apex concave.   | 3. Inner mandibular tooth with flat, broad apex.  |
| 4. Median hairs on mentum well behind labial palpi.  | 4. Median hairs just behind labial palpi.   |
| 5. Antennae castaneous ; pedicel just less than half the scape. Joints of funicle transverse ; third joint distinctly broader than long ; first joint with two sensoria ; bristle to spur of club as long as, or longer than, the last club joint. | 5. Antennae black ; pedicel one-third of scape. Joints of funicle never broader than long, gradually increasing ; joints 2 and 3 cylindrical ; first joint with six to seven sensoria ; bristle to spur of club very short, one-quarter of last club joint. |



*Thorax.*

- |   |   |
|---|---|
| 6. Two bristles and a clear spot (non-setigerous) inside furrows. | 6. Three bristles along inside of parapsidal furrows. |
| 7. Keel of propodaeum continued through middle of the metathorax. | 7. Metathorax not carinate.                           |

*Abdomen.*

- |   |  |
|---|--|
| 8. Second segment longer than third.                              | 8. Second segment subequal to third.                             |
| 9. Total length of ovipositor, .26 mm.; apical one-third serrate. | 9. Total length of ovipositor, .4 mm.; apical one-sixth serrate. |

*Legs.*

- |  |  |
|--|--|
| 10. Hind tarsi with joints 1 and 3 subequal, 2 longer. | 10. Hind tarsi with joint 1 shorter than 2, which is equal to 3. |
|--|--|

Genus *TETRASTICHODES*, Ashm.

The following species is separated from *Syntomosphyrum*, Först., mainly by the well-marked though fine furrow on the scutellum. The legs of this insect are unusually bristly and the first mid tarsal joint long.

***Tetrastichodes asthenogmus*, sp. nov. (fig. 6).**

*Head* a little broader than deep. Eyes seen from in front rather narrow and wide apart, the intervening space over twice the visible diameter of the eye. Mouth edge straight, transverse, with two inconspicuous central lobes. Scrobes oval, their lower edge just on the base line of the eyes. Vertex rather narrow, suture high up, so that the anterior ocellus lies within the wide angle formed by the frontal plates; suture between the plates disappearing at the scrobes, between which there is no median plate; a distinct keel from the clypeal corners to the lower edge of the eye. On the occiput are numerous short erect hairs; on the vertex medianly behind the

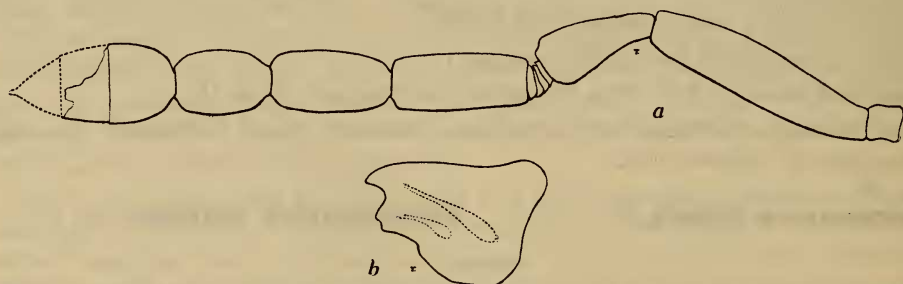


Fig. 6. *Tetrastichodes asthenogmus*, sp. n., ♀; a, antenna; b, mandible.

ocelli two short spinose hairs, and a similar pair on each side near the eye margin; from the anterior ocellus to the scrobes is a rather wide, practically bare median area; half-way to the orbits is an irregular row of minute bristles (8-10), and a similar row on the orbits themselves; between the scrobes is a double row (4, 4) of short stiff bristles, and from this level to the mouth edge are numerous (60-70) minute bristles.

*Antennae* (fig. 6, a) in both specimens imperfect, but probably with the following joints: scape, pedicel, ring joints, three funicular and three (?) to the club. The scape and pedicel are lemon-yellow in colour, the others fuscous. Scape with



numerous short bristles outside and 10–11 on dorsal and ventral edges; six times as long as broad. Pedicel one-third of the scape, narrow, over twice as long as broad. Four laminae—representing two or possibly three joints—intervene between pedicel and funicle. Funicular joints cylindrical, decreasing in length and almost exactly in the ratio 5:4:3, but of equal breadth, the first joint being about  $2\frac{1}{2}$  times as long as broad. Club 3-jointed (?), not expanded; the first joint slightly shorter than the last joint of the funicle; funicle and club very bristly.

*Mouth-parts*: mandibles (fig. 6, *b*) broad basally, with three teeth, of which the outer is large, separated by a semi-circular sinus from the inner pair, which are minute. Inner edge of mandible at first straight then much swollen towards the base. Cardio produced posteriorly into a hook, stipes with two hairs at side. Maxillary palpus long, with one outer hair at one-half and three at the apex. Labial palpus hardly more than a quarter of the maxillary and with similar hairs, those at the apex very long ( $2\frac{1}{2}$  times as long as the palpus itself). The usual bristle on the mentum is placed far back and not nearly between the base of the palpi.

*Wings*: fore wings over twice as long as broad, long and narrow, evenly ciliated, fringe short. Submarginal:marginal:radius, as 3:5:1; submarginal with 4 bristles, marginal with 13; radius club slender, with 4 cells. Length, 1.3 mm., breadth, .57. Hind wings about three times as long as broad. Submarginal:marginal, as 2:3. Length, 1.1 mm.; breadth, .27 mm.

*Thorax*: prothorax moderately broad, considerably sinuated above the spiracle on the posterior edge, coarsely reticulate all over, smooth, with many short bristles (40–45) on each side of a narrow smooth depressed area, and a posterior or marginal row of twelve stronger bristles. The prosternum is a truncate square with two short hairs before the posterior edge.

Mesonotum considerably longer than broad. Parapsidal furrows widely apart, deep; parapsides deeply invaded by axillae. Mid lobe with 25–30 short hairs, of which a pair at the sides of the apex are stronger; parapsides with about a dozen hairs; axillae bare. Scutellum oblong quadrate, with two widely separated deep lateral sulci meeting the suture outside the ends of the parapsidal furrows and concurrent with the inner edge of the axillae. There are also two faint impressed lines forming a square with the anterior and posterior edge of the scutellum. The end of the parapsidal furrow bisects the distance between the lateral and the faint inner scutellar furrows; from the middle of the suture two narrow lines go to the posterior ends of the faint lateral furrows. The square mid lobe of the scutellum is bare; on the narrow lateral lobes are, on each side, a strong and a weaker short bristle, and a curious minute knob on the suture. The reticulation of the mesothorax is comparatively even, all the cells being drawn out and pointed; anteriorly the parapsides are coarsest. On the mid lobe the surface *inside* the cells is a little raised. The scutellum, though densely reticulate like the rest of the mesothorax, is comparatively smooth, the pattern on the lateral lobes being extremely finely drawn out. The mesophragma is as long as the scutellum; mesopleurae, with furrow, entirely smooth; mesoprepectus with coarse striate reticulation, except along the anterior edge, with two minute hairs at ventral angle; mesosternum smooth, but with faint reticulation posteriorly, nearly bare, save for one or two minute hairs on each side near hind edge.

Metanotum smooth, side areas each with a short hair; the middle area slightly swollen and (after potash) exhibiting a trace of reticulation at the sides. Propodaeum more than twice as broad as long, sides nearly parallel; edge between pleura and sternum defined, smooth and very flat; central keel short and not distinct. Spiracle oval, as far from the centre as the length of the segment. Below the spiracle are three hairs on the metapleurae. Posterior edge of the propodaeum considerably excavated in the middle to receive the abdomen.

*Abdomen* sessile, brown, slightly shining, petiole minute, tergites subequal in length, medianly smooth and faintly reticulate on the overlapping sides; spiracles small, nearly circular. Each tergite bears a posterior row of short hairs (incomplete near the sides on tergite 1); in front of the row at the sides are one or two irregular short hairs, and from tergite 2 onwards there is a more or less continuous post-median row; on each side of the mid line on all the tergites one of the hairs is the longest in its row.

*Legs* conspicuous for their length, the difference being in the posterior pairs of tibiae. All the legs and the posterior coxae pale yellowish; the anterior and mid coxae dark, and the anterior femora a little infuscated. Anterior coxae large, a little swollen. In both fore and mid legs the preapical subventral bristle is long and stronger than the hairs of the ventral row. The tibiae are densely clothed with hairs or short bristles. The hind and mid tibiae are to the corresponding femora as 5:4. First joint of fore tarsi flattened slightly.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. ..	30	35	28	35
Mid .. ..	55	43	28	35
Hind .. ..	60	50	30	45

*Length*,  $1\frac{1}{2}$  mm. ; alar expanse, 3 mm.

Described from two ♀♀ taken on the egg-capsule of a cockroach, 7.i.14.